

# PATENT COOPERATION TREATY

TRANSLATION

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

|                                     |                      |
|-------------------------------------|----------------------|
| Date of mailing<br>(day/month/year) | See form PCT/ISA/210 |
|-------------------------------------|----------------------|

Applicant's or agent's file reference  
**10z1g/129283/PCT**

**FOR FURTHER ACTION**  
See paragraph 2 below

|   |   |   |
|---|---|---|
| International application No.<br><b>PCT/EP2004/013421</b> | International filing date (day/month/year)<br><b>26.11.2004</b> | Priority date (day/month/year)<br><b>01.12.2003</b> |
|---|---|---|

International Patent Classification (IPC) or both national classification and IPC  
**F02P23/04**

Applicant  
**GALLATZ, Volker**

1. This opinion contains indications relating to the following items:

- |                                     |              |  |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the opinion   |
| <input type="checkbox"/>            | Box No. II   | Priority   |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention   |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited  |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application   |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application  |

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

|  |                    |
|--|--------------------|
| Name and mailing address of the ISA/EP | Authorized officer |
| Facsimile No.                          | Telephone No.      |

WRITTEN OPINION OF THE  
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International application No.

PCT/EP2004/013421

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language  
\_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims 9, 10

YES

Claims 1-8, 11-14

NO

Inventive step (IS)

Claims

YES

Claims 1-14

NO

Industrial applicability (IA)

Claims 1-14

YES

Claims

NO

2. Citations and explanations:

**Closest prior art**

1. Reference is made to the following documents:

D1 = DE 198 02 745 A

D2 = JP 55007972 A

D3 = DE 199 14 941 A

D4 = US 4 446 826 A

D5 = US 2 617 841 A

D6 = JP 59 215 967 A

D7 = EP 0 680 243 A

**Claims 1 and 13**

2. The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claims 1 and 13 is not novel within the meaning of PCT Article 33(2).

2.1 D1 discloses a fuel being ignited by injection of microwave radiation produced in a microwave source outside the combustion chamber (claim 1 and column

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5, lines 10-28). In this case, the combustion is distributed over a large volume of a combustion chamber by the introduction of energy, which is created by absorption, into the fuel, and is *distributed uniformly throughout the entire combustion chamber, and is ignited at the same time* (claim 1, and claim 5, lines 21-50).

- 2.2 Please note: expressions such as *preferably* do not restrict the subject matter of the claim. In addition, the expression *larger volume* does not mean that the combustion takes place throughout the entire combustion chamber.

Apart from this, D2 discloses a magnetron (1) which produces steady-state microwaves in the combustion chamber. Combustion is thus ignited *essentially at the same time* at different points (10) in the combustion chamber.

- 2.3 A further example is the ignition system in D3. In this case, the air/fuel mixture in an internal combustion engine with compression ignition is heated by microwave radiation and is ignited in conjunction with the compression. The combustion which results in this way is *distributed uniformly throughout the entire combustion chamber and is ignited at the same time*.

- 2.4 Please note: the combustion chamber in claim 1 need not be the entire combustion chamber of the engine. It may also be a part of it, such as a prechamber.

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D4 (figures 1 and 2) proposes precisely that the combustion be carried out in a prechamber (9) by microwave absorption. The prechamber is separated by a grating in which the microwave radiation is collected in the prechamber, and the burning particles pass the combustion through the grating into the main chamber.

**Claim 7**

3. The same reasoning applies in a corresponding manner to the independent claim 7.

3.1 In particular, it should be noted here that the microwave radiation is normally supplied by conduction of microwaves into the combustion chamber, and a microwave window is used for protection of the conduction of microwaves and/or of the microwave source (the dielectric (36, 72) in D5 or the microwave window 6 in D6).

3.2 In D2, the element 2 in the figure has the functionality of microwave conduction, and of a microwave window.

The subject matter of claims 1, 7 and 13 is thus not novel (PCT Article 33(2)), and therefore also does not involve an inventive step (PCT Article 33(3)).

**Claims 2 to 6, 8 to 12 and 14**

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4. Dependent claims 2 to 6, 8 to 12 and 14 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT requirements for novelty and inventive step, see the documents and the corresponding text references cited in the search report.
5. The industrial applicability of claims 1 to 14 is obvious (PCT Article 33(4)).